

# MONTHLY WEATHER REVIEW

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## NOTICE OF CHANGE IN MONTHLY WEATHER REVIEW

The monthly climatological data tables will no longer be carried in the MONTHLY WEATHER REVIEW, effective with the issue of January 1950. These tables together with additional climatic information will hereafter appear in "Climatological Data, National Summary" (price 15c per month or \$1.50 per year). Paid subscribers to the MONTHLY WEATHER REVIEW will receive both publications until their present subscriptions expire.

Although the MONTHLY WEATHER REVIEW will no longer publish climatological data tables, it will continue to survey the weather of the month. The survey will consist of two monthly articles:

1. A discussion of the month's weather, including an interpretation of Charts I-XI in relation to the mean circulation patterns of the Northern Hemisphere.
2. A discussion of an outstanding weather situation of the month, including an analysis and interpretation of the meteorological features shown by synoptic weather charts.

In addition to reviewing the weather of the month, the MONTHLY WEATHER REVIEW will continue to publish contributions to meteorological science, particularly articles on synoptic and applied meteorology.

## THE WEATHER OF 1949 IN THE UNITED STATES

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[Weather Bureau, Washington, D. C.]

The winter of 1948-49 was a period of marked weather extremes which reached peak intensity during the first 6 weeks of 1949. This was the coldest winter on record west of the Continental Divide and the most severe on record in the northern Great Plains and generally throughout the Rocky Mountain and Pacific States. On the other hand it was the third warmest in most sections east of the Mississippi River. Extremes of precipitation were greatest in the Midwest and Great Plains where many sections received 200 to 400 percent of normal for the season.

Temperatures rose rapidly in the West during the last half of February and by the end of the month had returned to normal levels. The spring season (March-May), which was warmer than normal in practically all sections of the country, favored rapid growth of vegetation and enabled weakened livestock in the West to recover fairly rapidly. Much above-normal precipitation in the Great Plains and lower Mississippi Valley was unfavorable to small grains and caused considerable delay in planting and cultivation.

Summer (June-August) was also warmer than usual in all sections, especially in the Lake Region and the New

England and Middle Atlantic States where mean temperatures exceeded the normal by 4° to 6° F. Precipitation was below normal in the West, the northern Plains, and the Northeast but was generally normal or above in the southeastern quarter of the country. The cotton crop in the middle and eastern sections of the Main Belt suffered from lack of proper cultivation and from insect infestation due to prolonged intervals of rainy weather.

Autumn (September-November) was warmer than normal nearly everywhere in the United States, while only scattered sections received above-normal precipitation. This relatively warm, dry autumn was very favorable for the early maturity of most major crops and enabled harvesting operations to make rapid progress.

The number of severe local storms during May and June was one of the highest on record and total damage was very high, but these storms were relatively few during the other months. For detailed information on storms see articles on hurricanes and tornadoes elsewhere in this issue and tables of "Severe Storms" in each issue of the MONTHLY WEATHER REVIEW for 1949.

Tabulations of monthly and annual temperature departure from normal, percentage of normal precipitation, and total precipitation are given by States in tables 1, 2, and 3 at the close of this article.

*January.*—January was characterized by marked extremes of weather in different portions of the country. The severe cold in the West and the unseasonable warmth in the East established a monthly mean temperature contrast between the two sections that has seldom been exceeded. Other outstanding features of this month's remarkable weather were record snowfall and snowcover in portions of the West, damaging freezes in Texas and the extreme Southwest, severe and frequent ice storms in central portions of the country, blizzards which set new records for frequency and intensity in the Great Plains and Rocky Mountains, and unseasonably heavy precipitation in central and southwestern portions of the country.

From the western Great Plains to the Pacific coast, monthly mean temperature departures were more than 5° below normal and as much as 18° to 20° below in the northern portion of the Great Basin, while nearly everywhere east of the Mississippi River plus departures exceeded 5° and were as much as 12° in the southern Appalachians.

This was the second coldest January on record west of the Continental Divide, only January 1937 being colder. However, January mean temperature of 6.9° for Idaho established a new low for that State, and numerous cities throughout the West also experienced their coldest January on record—among these are Missoula, Mont.; Boise, Idaho; Salt Lake City, Utah; Winnemucca, Nev.; Fresno, Los Angeles, Bakersfield, and San Diego, Calif. San Diego's record extends back to 1850. It was the second coldest January since 1865 at Prescott and Yuma, Ariz. New extreme low temperature records were established during January at several stations in southeastern Idaho and central Texas, and the extreme January low of -33° equaled the all-time record for Arizona. The -5° at Waco and Taylor, -2° at Austin, and 0° at San Antonio, Tex., were the lowest temperatures ever recorded at those stations.

Precipitation was much below normal in the extreme Northwest and Southeast. January totals were the lowest on record for Washington and Oregon and the lowest in 59 years for the southern half of Florida. Elsewhere the normals were exceeded, with most of the southwestern and central sections of the country receiving twice their usual amounts. The average January precipitation was the greatest of record in Kansas, Iowa, Oklahoma, South Dakota, and Nebraska, and the second greatest in Arizona, New Mexico, Illinois, and Arkansas. At many stations in eastern Nebraska 24-hour amounts of precipitation were the heaviest ever recorded in January.

Much of the precipitation west of the Mississippi was in the form of snow and the January average snowfall was the greatest of record in Louisiana, Texas, Kansas, Nebraska, the Dakotas, Wyoming, Utah, Arizona, and southern California, and the second greatest in Oklahoma and New Mexico. A January total of 77.4 inches at Deadwood in the Black Hills region was the greatest monthly snowfall ever officially measured in South Dakota. A number of stations in southern California, and most stations in southern Arizona, New Mexico, and Texas reported snowfall, some of them for the first time during periods of 75 to 100 years.

Snowfall in east-central Nevada, western Utah, western Nebraska, and north-central Arizona established new records for 24-hour amounts, monthly totals, and amounts

for a single storm. Record depths on the ground were also measured due to a heavy snowcover already on the ground at the end of December. In north-central Arizona, snow depths were as much as 5 feet on the level, and the average snowfall for the state was 400 percent of normal. In east-central Nevada, Kimberly received 28 inches of snow during the month and the greatest depth on the ground was nearly 3 feet. The total January snowfall in western Utah ranged from 2 to over 4 feet and depths on the ground ranged up to 3 feet. In western Nebraska, 24-hour amounts ranged up to 3 feet; the monthly total at Agate exceeded 4 feet and the greatest depth on the ground was 40 inches.

High winds combined with frequent snows and persistent low temperatures created blizzard conditions during most of the month in the northern portion of the western plains and portions of the Rockies. The blizzard of January 2 to 5 was one of the most severe on record in these areas. At Rapid City, S. Dak., the average wind speed on the 3d and 4th exceeded 50 m. p. h., with extremes above 70 m. p. h. Temperatures remained below zero, and visibility was less than 5 feet the greater part of the two days. Fourteen inches of snow fell, with drifts 15 feet high at Rapid City, while railroad and highway cuts west of the city were filled to a depth of more than 20 feet.

Somewhat similar conditions which prevailed in western Nebraska on January 3 to 5 were described as the worst ever to visit that region, although temperatures were not quite as low as during some other storms. At North Platte the 24-hour wind speed averaged 41 m. p. h. on the 3d with gusts up to 65 m. p. h., and the day's snowfall totalled 8.8 inches.

The duration of blizzard conditions at Cheyenne, Wyo., was the greatest of record, and the storm of January 3 to 4 was the worst ever to occur in that state. Blizzard conditions prevailed most of the month in the Dakotas, although not of unusual severity in North Dakota.

This combination of wind, snow, and cold created the most adverse weather conditions in the history of the West. Livestock losses in Nevada, Utah, Wyoming, Colorado, western South Dakota, and Nebraska were very heavy. Losses in Wyoming alone were estimated at \$9,000,000. Transportation was blocked during the greater part of the month in many areas and many communities were still snowbound at the end of the month. A hard crust formed on the snow in some sections and it was closely packed in others, both conditions making snow removal difficult. Also, the high winds often refilled the roads as soon as they were opened.

The severe cold damaged citrus and truck crops in southern California and Arizona to the extent of many million dollars, causing the greatest loss since the severe freeze of 1937. A freeze on the 30th, with minima in the 20's, caused considerable loss of citrus and vegetables in southern Texas.

The prolonged cold weather in northwestern areas also caused much damage. Fruit trees were cracked in the Willamette Valley of Oregon, electricity became short, frost penetration was unusually deep throughout the state, and many water mains froze. In western Montana several cities recorded zero minima on more than 20 days, resulting in a frost penetration of 7 feet or more and the freezing of thousands of water pipes. Ice was 36 inches thick in the upper Missouri, and Flathead Lake froze over for the 3d time since the 1880's.

In the Great Plains and Mississippi Valley interacting warm and cold air masses caused perhaps the greatest variety of weather conditions ever experienced in a single

month. Thunderstorms were reported as far north as Minnesota; tornadoes swept through Kansas, Louisiana, Mississippi, and Arkansas; hail fell in Missouri; ice storms occurred at intervals throughout the month; windstorms were numerous; and heavy rains caused considerable flooding.

Icing was especially severe in central Missouri, western Illinois, southeastern Kansas, southeastern New Mexico, and north-central Texas. These ice storms were the most severe ever known in parts of these regions, causing a number of deaths and many injuries, and many millions of dollars damage, as well as forcing many schools to close, disrupting communications, and delaying traffic. At the end of the month even the Southern States, including areas along the Gulf, experienced this phenomenon with the worst ice storm in Atlanta's history cutting off power for 6 hours.

On January 18 a heavy snowstorm occurred in the Great Plains that covered an extensive area in a remarkably short time. It moved 1,000 miles in 24 hours and covered a belt 150 to 200 miles wide with heavy snow, the latter figure probably representing the near-limit of a belt over which heavy snow can occur during a single storm. The snow cover at the end of the month was one of the most extensive on record, covering all of the country except narrow coastal belts in the extreme West and South and a small area in the Southeast. An extensive snow cover throughout the month protected small grains which were in good condition at the end of the month.

*February.*—In February the weather continued colder than usual in the West and northern Great Plains and warmer than normal in the lower Great Plains and East, with the average temperature departures ranging from minus 12° in the Rocky Mountain States to plus 10° along the central Atlantic coast. The distribution of precipitation was very irregular with greatest excesses occurring in the Southern States, the Ohio Valley, and the extreme Northwest, and the greatest deficiencies in the northern Great Plains and Southwest.

Severe cold weather continued to grip the West during the first half of the month. Vegetation was damaged in California's San Joaquin Valley where the number of days with below-freezing temperatures set new records and new February mean records were established at many stations. Crops were retarded throughout southern California and Arizona.

Frost penetrated to record depths in exposed places of Montana. Depths up to 8 feet were reported, with hardly a city in the State escaping serious difficulties from frozen water pipes. Water pipes also were damaged in several other western areas. Several cities resorted to water deliveries by truck.

Frequent light to heavy snows fell in the western Mountain and Pacific States, the averages for Oregon, Idaho, and Utah setting new records. Record depths on the ground were measured at stations in Nevada, Idaho, Utah, and in the Cascades. The heavy snows were drifted by high winds, blocking rail and highway transportation and isolating several communities. Most roads leading to stranded herds of livestock had been opened by the beginning of the month, but it was a continuous struggle to keep them open due to the high winds continually redrifting the roads. Many livestock that were saved were further weakened by the persistent cold. The critical areas were western South Dakota, western Nebraska, eastern Wyoming, northeastern Colorado, western Utah, eastern Nevada, northern Arizona, and a few adjacent areas.

An unusually severe blizzard on the 16th and 17th occurred in Montana along the eastern slope of the Continental Divide. High winds, with gusts up to 90 m. p. h., damaged roofs and windows and blew a car off the road near Sweetgrass.

A rising temperature trend prevailed in the West after the middle of the month, although temperatures in most sections averaged below normal during the third week. During the last week above-normal temperatures prevailed throughout the West, and the snowcover at lower elevations melted.

The entire month was abnormally warm in the East. Cold waves near the beginning and end of the month brought freezes to the deep South but were not severe enough to cause serious damage. Snowfall was generally below normal east of the Mississippi River.

Livestock in the critical areas of the West made rapid improvement during the last half of the month, although some were still in a weakened condition. Small grains came through the month in mostly good condition, due to a protecting snowcover during the period of extreme cold. Dry, hot weather injured non-irrigated citrus in southern Florida.

*March.*—In contrast to the preceding 2 months, March weather conditions were nearly seasonal. Temperatures averaged near normal, except in some sections of the Northeast where plus departures exceeded 6°. Precipitation was unevenly distributed and monthly totals were generally above normal, although there were slight deficiencies in many sections west of the Continental Divide, in a narrow belt along the Southwestern Border, and in the Atlantic Coastal States.

During the first week in the Southern States below-normal temperatures and frosts retarded crop growth and caused some local damage to advanced fruit. Generally the weather was seasonably mild and dry in the remainder of the country. In western areas warm days and below-freezing temperatures at night caused a gradual melting of the heavy snowcover, thus reducing the flood potential. Floods resulting from ice jams washed out several bridges in Montana, Iowa, Nebraska, and Kansas. New England received its heaviest snowstorm of the season on the 1st.

The 2d and 3d weeks were cold and stormy in central and southeastern areas with truck crops and advanced fruit buds suffering some damage in the latter areas. On the 10th, Ohio received its heaviest snowstorm of the season, 4 to 10 inches. From a general snowstorm over the northeastern quarter of the country on the 17th and 18th, most stations in Michigan, New York, and New England received 2 to 6 inches of snow but most of this soon melted. Light snows in the northern Great Plains and heavy snows in Colorado, Wyoming, and Montana were frequent during the period.

East of the Mississippi River the last 10 days were unseasonably warm, temperatures averaging as much as 15° above normal along the central Atlantic coast. Maximum temperatures, which are normally in the 50's during this period, rose to 80° F. at many stations on the 27th. Ice and snow had mostly disappeared in New England by the end of the month, and vegetation was 2 to 3 weeks ahead of normal development throughout the East.

The last decade was generally cold and stormy in the Central and Rocky Mountain States. A depression of storm intensity crossed the central interior on the 25th and 26th. During its passage heavy snows fell in the central Rocky Mountain and North Central States, heavy rains and thunderstorms occurred in the Mississippi Valley, and a number of severe tornadoes left paths of

destruction in scattered sections of the lower Great Plains and the lower Mississippi Valley.

Similar conditions accompanied the passage of a second depression across this region during the closing days of the month. Heavy rains fell over central Gulf areas, with 24-hour amounts exceeding 4 inches at many stations.

A snowstorm in Nebraska on the 29th and 30th was described as one of the most severe on record in southwestern and north-central portions. Total snowfall ranged from 12 to 28 inches in the southwestern part and up to 15 inches in north-central localities. Damage to communications and losses of livestock caused by high winds and heavy drifting snow amounted to nearly \$300,000 in this State. On the 30th a tornado caused 4 deaths, more than a score of injuries, and over a million dollars property damage in northwestern Oklahoma. Extremely heavy rainfall was reported from points along its path, with estimated amounts ranging up to 10 inches in less than an hour.

*April.*—April was relatively warm and dry. Temperatures generally averaged somewhat below normal in the southeastern quarter of the country but above normal elsewhere with plus departures as much as 6° to 8° in the central Rocky Mountain region and in extreme north-central areas. Total precipitation was above normal only in Pennsylvania, New Mexico, and the Gulf and Atlantic Coastal States.

The first few days of the month were cold and stormy in the Great Plains and southern Rocky Mountain States. Heavy snows blocked roads in Colorado and Minnesota and damaged power and communication lines in the latter State. A new all-time low April temperature for Arizona was established on the 2d when Maverick recorded -8° F.

A coastal storm caused winds of gale intensity in southern New England on the 6th, resulting in considerable damage to overhead wires and small buildings on land and a number of small boats along the coast. From the 13th to the 15th a storm, accompanied by high winds and light to heavy precipitation, moved from the lower Great Plains to New England. In north-central areas snowfall up to 8 inches or more was blown into drifts 3 to 4 feet high in portions of Iowa, southern Minnesota, and eastern Nebraska. A cold air mass, which overspread the eastern half of the country in the wake of this storm, brought below-freezing temperatures and frost to the northern portions of the Southern States on the 17th. This freeze was reported as one of the latest damaging freezes on record in South Carolina.

Except in Texas and the Southeast where it was too rainy, weather conditions during the last 10 days were favorable for agricultural activities, crop growth, and livestock. The most damaging flood of the month occurred in southern Texas between Rio Grande City and Laredo, where 5 to 10 inches of rain fell from the 23d to the 25th. Damage was estimated at \$2,700,000 to cotton and \$600,000 to tomatoes. Much greater damage was averted due to timely warnings. A flash flood caused \$2,000,000 damage at Herington, Kans., on the 30th.

Total storm damage for April was less than usual. On the 19th a hailstorm in the vicinity of Del Rio, Tex., caused \$1,525,000 damage. Fourteen tornadoes occurred in Oklahoma on the 30th, causing 6 deaths, 71 injuries, and \$1,590,000 damage. This is a greater number than ever previously reported for any month in Oklahoma. The first tornado ever officially reported in Nevada occurred a few miles north of Reno on the 18th.

*May.*—In May temperatures were slightly above normal over the entire country, with departures exceeding

5° at only a few stations in extreme north-central areas. The first 10 days were unusually warm east of the Rocky Mountains, especially in the northeastern quarter where temperatures averaged 10° to 15° above normal. New record high temperatures were established at many stations in the Lake Region on the 3d when temperatures rose to over 95° F. The last week was cold in the eastern third of the country, and late-season frosts occurred in north-central areas and in the Northeast as far south as Maryland.

Precipitation was much above normal in portions of the central and lower Great Plains, along the central Atlantic coast, and in some sections of the extreme Southwest; but was considerably below normal in Washington, Florida, southern Texas, and in a considerable area immediately west of Lake Michigan. The locally heavy rains in central sections resulted in several damaging floods. Fort Worth, Tex., experienced its worst flood in history as a result of a heavy rain that measured up to 10 inches in 24 hours on the 16th and 17th; damage was estimated at \$6,000,000. Total rain and flood losses in Kansas and Nebraska were estimated at nearly \$300,000. Heavy rainfall in northwestern Minnesota on the 29th that measured 7.50 inches in 6 hours at Thief River Falls caused damage estimated at \$361,000.

This May was outstanding for the great number of severe local storms with at least one being reported for every day in the month. From the 20th through the 22d during the passage of a major depression over the central portion of the country, these storms averaged more than 30 per day. Total damage by the different types of storms was as follows: tornado, over \$18,000,000; wind, nearly \$5,000,000; hail, over \$20,000,000; electrical, slightly over \$200,000. The month's storm losses in Oklahoma, Kansas, and Texas totaled over \$8,000,000 in each State, and over \$5,000,000 in Nebraska, and about \$6,000,000 in Missouri. The two most destructive tornadoes caused \$4,779,000 damage at Amarillo, Tex., on the 15th, and \$4,000,000 damage at Cape Girardeau, Mo. on the 21st, with 29 deaths and 213 injuries. Individual hailstorms which caused over \$1,000,000 damage each were reported from Kansas on the 18th, Chase County, Nebr., on the 19th and 23d, Oklahoma on the 20th and 31st, Texas on the 27th, and Kansas on the 23d. In the storm in Kansas on the 18th, some hailstones as large as baseballs were reported. Total storm damage for the month was estimated at over \$50,000,000.

*June.*—The outstanding feature of the weather in June was the combination of drought and high temperatures in the Northeast. June was the driest month in New Jersey since records began in 1866. It was the driest June on record in Pennsylvania and the second driest in New York and southern New England. Many stations in eastern Massachusetts, several on Long Island, and scattered stations in New Jersey received not even a trace of rain during the month. It was the hottest June on record in New York and the hottest in New England since 1913.

Truck crops suffered heavily, especially in New Jersey and deteriorating pastures caused a reduction in dairy production. Fruit also deteriorated in southeastern New York and southern New England. In New Jersey, the reduction in yields of sweetcorn and potatoes was estimated at 50 percent. The forest fire hazard was great, and although some fires broke out in New England, they were effectively controlled without serious damage.

In other sections of the country temperatures averaged slightly higher than normal. Precipitation was also much below normal in the far West and some north-central

sections, but heavier than usual in much of Arizona, Colorado, and scattered areas of the central interior and Southeast. The month's average precipitation for Colorado was the highest on record.

Several damaging floods occurred in the areas of heavy rainfall. Total flood damage for the two States of Kansas and Nebraska totaled between 1 and 2 million dollars. One of the worst flash floods in several years occurred in the Virginia-West Virginia border area on the 17th-18th, when the south branch of the Potomac in West Virginia and the upper reaches of the Shenandoah River in Virginia overflowed as a result of torrential rains which exceeded 12 inches in 24 hours at some stations. The Petersburg-Moorefield area in West Virginia and the Stokesville-Bridgewater area in Virginia suffered most. A dozen or more lives were lost and 2,400 people driven from their homes. The total damage was estimated at more than \$9,000,000.

Heavy rains in western North Carolina from the 14th to the 16th caused flash floods along several streams, resulting in damage estimated at nearly \$2,000,000. Two new rainfall records were set at Hatteras, N. C. during the month—14.73 inches on the 30th established a new 24-hour record and a monthly total of 20.95 set a new all-time high at that station for any month.

In Scott, Clark, and Washington Counties, Ind., 6-hour rains up to 8 to 9 inches on the 15th caused flash floods which resulted in \$100,000 damage. And again on the 26th, over 6 inches of rain in less than 3 hours resulted in flood damage of about \$500,000 in this state. A flash flood in the Lamar-Holly-Bristol area of Colorado on the 4th-5th caused \$2,000,000 damage.

Severe local storm damage was heavy in the Great Plains, but generally less than usual in other areas. Total damage for the entire country exceeded \$10,000,000. Of the three individual storms causing damage of a million dollars or more each, two were reported from Kansas and one from Colorado. Total storm damage in Kansas was estimated at \$3,621,000.

Frost caused minor damage in portions of the Great Basin. On the 8th and 9th slight damage resulted from frost which occurred in sections of the Lake Region and Northeast. An extraordinary late-season snowstorm occurred a few miles southwest of Helena, Mont., on the 16th, with 30 inches falling at Chessman Reservoir in 12 hours.

*July.*—Except for a relatively small section in the extreme Northwest, July was warmer than normal, especially in the Lake Region and Northeast where mean temperatures exceeded the normals by 6° or more. This was the hottest July on record in New Jersey and Maryland, the second hottest in New England, and the third hottest in West Virginia and Pennsylvania. This period of intense heat, which began about the middle of June, was one of the longest on record.

During a cool period at the beginning of the month in the Northwest frost caused minor damage to vegetables in eastern Washington. Some snow fell on higher peaks and frost occurred at higher elevations during a second cool period near the close of the month.

Precipitation was irregularly distributed but was below normal in several Western States and the Northeast, particularly New York, New England, and New Jersey. In the Northeast the lack of rain along with the intense heat was very detrimental to crops, especially vegetables, and pastures; ground water levels declined; and the forest fire hazard became acute. In other sections of the coun-

try precipitation was normal or above, the greatest excesses being measured in the agricultural regions of the Midwest and South.

Damage resulting from severe local storms was unusually low and only a few tornadoes were reported. Tornado damage estimated at \$1,000,000 occurred in Union County, S. Dak., on the evening of the 31st. North Dakota was the scene of the month's most destructive hailstorm, which caused property damage exceeding \$1,000,000 in the northern part of Bismarck, and extensive crop damage in surrounding communities. The stones in this hailstorm, which was described as Bismarck's worst in 25 years, measured up to 2½ inches in diameter and, driven by strong winds, chipped paint from houses. A thunderstorm accompanied by severe lightning, heavy hail, and high winds caused about \$5,000,000 damage in southern New England. Total storm damage for the month exceeded \$11,000,000.

*August.*—August was generally a warm, dry month. Only in Florida, Georgia, Arizona, the lower Great Plains, and some interior sections of the Pacific States did temperatures average below normal, and minus departures were generally under 2°. Monthly means were slightly above normal in the remainder of the country, although plus departures exceeded 6° at a few stations in the extreme northern portion of the Great Plains. Arizona's below-normal temperature average was mainly due to unusually cool nights from the 10th to the 20th. Early season frosts occurred at higher elevations, causing some damage to the bean crop in the Flagstaff area on the 17th.

Precipitation totals were above normal only at scattered stations in central areas, in the western portion of the Middle Atlantic States, and along the Atlantic coast from Virginia southward. Much of the Far West was extremely dry. Nevada received only 4 percent of its normal precipitation and many sections in other States received less than 25 percent. Most of the above normal precipitation along the East Coast fell from the 26th to the 29th.

Most of the month's storm damage resulted from the Florida hurricane which swept northward to New England. Damage in Florida was estimated at \$45,000,000, and a total of several million dollars more damage occurred along the path north of Florida. A million-dollar flash flood occurred on the 11th in the Moline-Rock Island vicinity of Illinois when 7 inches of rain fell in less than 24 hours.

The dry, hot weather in sections of the Northeast during June and July continued during the first half of August. Crops were further parched, many minor forest fires broke out, and the water level further declined in this region. The surface effects of the drought were broken by rains during the latter part of the month, but ground water levels remained low.

*September.*—Monthly mean temperatures in September averaged above normal in the Mountain and Pacific States, southern Texas, Florida, and northern Maine, with plus departures exceeding 6° at most stations in the central portion of the Great Plains. Below normal means in the remainder of the country showed minus departures of more than 6° at a number of stations in the Midwest.

The frequent penetration of cold Canadian air masses into the eastern half of the country resulted in the coolest September in that region in many years. Mean temperatures in several States in the Midwest were the lowest since 1918. Killing frosts were 1 to 2 weeks earlier than usual in the North Central States, but due to the early

maturity of most major crops only minor damage resulted.

In spite of the above-normal monthly mean temperatures in the Mountain and Pacific States, frosts were a week to 10 days earlier than usual in most central and northern districts of this region, where some damage occurred. The first week was hot in the Great Basin with Winnemucca, Nev., recording a new record high temperature of 98° F. on the 1st. The last week of the month was also extremely warm in the Great Basin where weekly means exceeded the normal by 12° at a number of stations. On the 12th the temperature dropped 35° in an hour at Boise City, Okla., during the passage of a cold front.

Precipitation was below normal for the nation as a whole, and very unevenly distributed. Areas with above-normal precipitation included a section along the lower portion of the Continental Divide, southern portions of the eastern Great Plains, an area along the central Gulf coast, Florida, western New York, and eastern New England. Precipitation in these areas generally occurred as brief showers during the first half of the month, resulting in more fair weather than usual. The number of severe storms was unusually low. On the 24th and 25th the Airport at Jacksonville, Fla., reported 10.13 inches of rain in 24 hours which flooded streets and caused some minor damage.

*October.*—In October monthly mean temperatures varied only slightly from the normal in the Great Plains and Far West, but plus departures exceeded 6° in some sections east of the Mississippi River. Except for a warm period in the Southwest during the third week, cooler than normal weather predominated in the western States until

the closing days of the month. During the first decade, killing frosts occurred in many interior sections west of the Continental Divide as far south as northern Arizona where the bean crop was damaged slightly.

The West's lowest temperatures of the month were experienced from about the 18th to the 21st when a cold Canadian air mass overspread the entire region and subsequently the entire country. It began its invasion in Montana with the season's earliest blizzard occurring along the northern portion of the Divide where minimum temperatures below 10° F., high winds, and drifting snow blocked roads and caused three deaths. During this period killing frost ended the growing season in the agricultural valleys of western Oregon several weeks earlier than usual and the growing season was ended in most other interior sections of the West that escaped killing frosts during the first week of the month.

Above-normal temperatures which prevailed east of the Great Plains during the first 3 weeks reached record values at some stations. Rochester, N. Y., reported its highest October temperature of record, 89°, on the 10th. On the 27th a cold Canadian air mass overspread this region reducing temperatures to seasonal levels and bringing the season's first general killing frost to the northern half. Many northern stations reported their first snowfall of the season during the last 10 days of the month.

A tropical disturbance moved inland near Houston, Tex., on the 4th, its center moving in a path across southeastern Texas, northwestern Louisiana, eastern Arkansas, southeastern Missouri, western Illinois, southeastern

TABLE 1.—Monthly and annual temperature departures from the normal (°F.), 1940

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama	7.7	4.9	-2.1	-1.2	1.6	-0.3	0.5	-0.1	-3.2	5.4	-1.4	2.3	1.2
Arizona	-8.3	-5.3	-1.3	1.8	-5	-2	-4	-6	2.5	-2.2	5.4	-1.2	-9
Arkansas	0.9	2.4	-1.6	-1.6	2.2	8	-6	-2.4	-5.1	0	1.0	2.1	-1
California	-9.7	-5.3	-2.8	2.8	-7	1.4	-1.3	-2.5	1.9	-1.9	4.5	-2.3	-1.3
Colorado	-7.8	-3.3	1.0	1.6	1.0	-6	4	3	1.0	-1.2	-8.7	1.1	2
Florida	5.7	7.2	-2	1.3	.9	-1	.3	-2	1.4	3.8	-2.9	3.6	1.7
Georgia	8.5	7.0	-8	-1.6	.6	-1.3	4	-7	-2.2	4.6	-2.3	2.2	1.2
Idaho	-16.8	-4.5	1.1	3.3	3.3	0	-6	1.5	2.7	-4.9	5.6	0	-8
Illinois	2.6	2.0	.1	9	2.4	2.5	2.0	0	-6.1	2.9	1.8	4.5	1.2
Indiana	5.6	4.1	.5	-1.3	1.4	2.1	2.8	.1	-6.1	4.0	.2	3.5	1.4
Iowa	-1.6	-3.0	-1.2	.4	3.1	2.9	1.3	4	-5.2	3.0	4.3	2.7	.6
Kansas	-7.2	-1.4	-5	-6	2.1	.9	0	-2.1	-4.4	.8	5.8	1.3	-4
Kentucky	8.0	5.9	-7	-2.4	1.0	.9	2.5	-5	-5.8	3.3	-1.1	3.1	1.2
Louisiana	3.7	3.3	-1.4	-2.1	2.0	.6	.2	-1.1	-1.1	2.8	-7	2.8	.7
Maryland-Delaware	8.2	8.0	1.9	.4	.5	1.9	3.5	1.3	-3.0	4.5	.4	3.5	2.7
Michigan	5.2	4.5	.9	1.5	2.0	4.3	2.3	1.9	-3.3	4.5	9	2.7	2.1
Minnesota	-2	-4.5	-2.5	1.9	2.5	2.3	1.2	3.0	-3.2	1.4	4.7	-1.1	.5
Mississippi	6.4	3.5	-1.3	-1.6	1.9	.3	4	9	-1.9	3.6	4	3.1	1.1
Missouri	.0	1.9	4	-1.1	3.1	1.6	.8	-1.5	-6.3	1.4	3.1	3.8	.5
Montana	-14.6	-7.8	-1.8	5.3	3.5	.2	-9	3.0	.2	-4.3	9.8	-5.2	-1.0
Nebraska	-10.6	-4.0	-7	1.2	2.8	.8	.6	0	-3.3	3	8.1	1.3	2
Nevada	-14.9	-6.8	-2	4.7	.9	1.2	-3	-3	3.5	-1.7	7.1	6	-8
New England	5.8	4.6	1.8	2.6	2.7	3.8	3.3	2.5	-1.7	3.9	-1.4	3.2	2.6
New Jersey	7.2	7.3	2.9	2.0	.8	3.0	4.1	2.7	-2.2	5.2	1	3.5	3.1
New Mexico	-5.2	-1.2	1.7	.2	1.1	1.3	.6	.2	1.2	-1.8	5.3	-1.5	-5
New York	5.7	6.6	1.4	1.3	.8	4.9	3.5	2.7	-2.7	4.6	-1.9	3.2	2.6
North Carolina	8.7	7.0	.9	0	.7	.8	3.1	.7	-2.1	4.4	7	2.7	2.2
North Dakota	-5.3	-7.5	-1.9	5.6	2.1	.9	.5	4.5	-1.2	7	10.3	-4.6	.2
Ohio	8.0	7.0	1.8	-1.0	2.0	3.8	3.8	1.5	-4.8	5.3	.8	3.9	2.7
Oklahoma	-6.6	-8	-1.3	-1.6	1.9	.7	.6	-3.0	-4.7	8	3.3	1.5	9
Oregon	-12.9	-2.5	5	2.9	3.4	.4	-1.5	5	1.8	-4.7	4.7	5	-1.0
Pennsylvania	7.0	6.8	1.2	4	.4	2.5	3.3	1.2	-4.2	4.3	8	2.4	2.0
South Carolina	8.3	6.3	0	-1.4	0	-7	.9	1.3	-2.6	3.6	-1.9	1.1	1.1
South Dakota	-2.1	-5.6	-1.3	3.1	3.5	1.4	1.8	2.9	-3.3	6	9.3	-2.7	1
Tennessee	7.4	4.5	9	-2.3	1.4	.7	1.7	8	-4.5	4.2	-1.0	2.9	1.1
Texas	-7.1	3	9	-3.7	1.2	4	4	-2.6	-1.5	-1.7	1.4	1.2	-1.3
Utah	-12.7	-9.3	0	4.3	1.2	-1.3	4	.1	2.4	-2.7	6.0	9	-1.1
Virginia	7.7	7.0	.1	8	1	.9	2.5	.2	-3.5	3.7	3	2.5	1.7
Washington	-13.0	-5.2	6	1.2	2.8	6	-1.6	5	2.0	-4.2	4.3	-1.3	-1.4
West Virginia	9.3	7.8	1	-1.1	1.1	1.8	3.7	.8	-4.5	5.1	-1.1	3.2	2.2
Wisconsin	3.6	.8	.2	1.4	2.7	4.0	2.5	2.3	-4.0	3.7	2.0	1.9	1.8
Wyoming	-12.5	4.0	1.3	5.1	2.5	0	.6	2.4	1.0	-3.6	8.9	0	.7

Wisconsin, and northern Lower Michigan. The intense winds and rainfall caused heavy damage to rice and moderate damage to cotton and property in Texas, and some damage to cotton and rice in Louisiana and Arkansas. Property damage in southeastern Texas was estimated at \$400,000.

On October 10th occurred one of the most damaging storms ever to visit the northern Great Plains. Moving into the central Great Plains as a minor depression on the night of October 9, it gained great intensity over western Nebraska, and during the 10th the center of the storm moved from this location northeastward across South Dakota, southeastern North Dakota, and extreme northwestern Minnesota. Huron, S. Dak., near the center of the storm, recorded its lowest pressure on record. Damaging winds were reported in Iowa, western Michigan, and Wisconsin, as well as in the states crossed by the storm's center. At many points, wind velocities averaged 50 to 65 m. p. h. for a period of 3½ hours. Gusts reached 70 to 100 m. p. h. over a large area. Damage by states was: Nebraska, \$1,000,000; South Dakota, \$500,000; Minnesota, \$2,500,000. Damage based on an estimated settlement of insurance claims in Iowa indicated a loss of at least \$3,000,000, but the total was probably much greater. No estimate of damage is available for Michigan and North Dakota.

Precipitation was below normal in Florida, the Northeast, the Lake Region, and west of the Continental Divide; elsewhere, it was above normal with greatest excesses being recorded in the South Central States. The heaviest

precipitation of the month occurred along the path of the tropical disturbance of October 3-5, its path extending from east Texas to the Lake Region. Twenty-four-hour rainfall totals ranged from 2 to 7 inches in Texas and the lower Mississippi Valley and from 1 to 2 inches in the upper Mississippi Valley and the Lake Region.

Even though some sections received generous rains, there was generally much sunny weather which permitted harvesting activities to make good to excellent progress. With adequate soil moisture in most areas small grains were generally in good condition at the end of the month, especially in the Great Plains belt where growth was very good to excellent and progress above normal.

*November.*—This was the second warmest and sixth driest November in the United States during the last 57 years. Temperatures were almost continuously above normal west of the Mississippi River where plus departures generally exceeded 4° and ranged from 8° to more than 14° in the northern Great Plains. East of the Mississippi monthly mean temperatures generally averaged within 2° of normal. State averages show this November to be the warmest on record in Washington, Nevada, Montana, Wyoming, Utah, Colorado, New Mexico, Nebraska, and the Dakotas, and to equal the record for Oregon. The former record for Colorado was exceeded by more than 3°. This was the second warmest November on record in Kansas, California, Idaho, and the third warmest in Arizona.

Scattered stations throughout the western and north-central portions of the country registered new maximum

TABLE 2.—Percentage of normal precipitation, 1949

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama.....	130	117	101	125	103	135	121	98	101	116	25	76	106
Arizona.....	239	58	47	58	91	247	95	56	123	129	34	95	97
Arkansas.....	234	112	114	55	105	125	117	88	97	262	10	112	117
California.....	58	69	147	10	135	19	18	59	22	25	82	53	70
Colorado.....	190	69	114	63	132	226	102	67	63	103	30	62	102
Florida.....	32	88	66	171	60	112	105	136	112	90	84	86	102
Georgia.....	70	116	59	149	102	114	96	128	86	113	40	61	96
Idaho.....	50	169	61	39	127	49	40	60	90	108	96	88	86
Illinois.....	260	136	100	50	67	104	136	86	76	194	26	220	112
Indiana.....	255	119	101	56	82	135	105	110	80	176	37	164	115
Iowa.....	269	80	144	51	103	121	96	62	80	84	28	98	89
Kansas.....	461	118	135	83	143	148	123	87	80	126	12	101	120
Kentucky.....	157	164	109	88	70	132	99	123	64	170	53	150	114
Louisiana.....	122	106	165	139	60	110	132	79	97	223	8	94	109
Maryland-Delaware.....	162	118	79	79	130	51	106	96	98	117	63	72	97
Michigan.....	138	123	98	68	84	132	147	85	82	94	90	144	105
Minnesota.....	207	54	140	35	101	99	188	61	61	175	79	134	106
Mississippi.....	167	105	142	104	109	132	125	94	122	184	10	80	114
Missouri.....	276	123	105	41	96	136	139	80	120	207	16	168	119
Montana.....	112	151	89	51	91	62	86	50	76	133	56	114	83
Nebraska.....	352	41	220	63	142	130	77	102	104	116	22	43	112
Nevada.....	124	85	89	30	227	64	67	56	64	62	81	50	89
New England.....	119	94	62	104	108	48	73	77	114	67	87	76	86
New Jersey.....	165	106	68	103	132	6	82	76	113	69	49	83	87
New Mexico.....	278	91	59	107	98	179	133	68	132	63	11	73	107
New York.....	121	91	64	110	88	40	83	116	104	54	88	93	87
North Carolina.....	75	94	70	125	116	127	111	171	97	128	102	61	109
North Dakota.....	238	98	77	32	104	75	145	48	37	248	49	135	96
Ohio.....	186	104	84	83	81	107	111	98	93	67	55	110	99
Oklahoma.....	363	149	105	59	165	125	98	69	123	121	6	96	118
Oregon.....	28	179	82	40	135	36	50	32	87	85	99	84	86
Pennsylvania.....	142	94	57	105	94	46	128	89	93	71	61	108	91
South Carolina.....	62	122	54	154	97	91	85	172	95	121	97	56	102
South Dakota.....	275	25	110	57	91	56	83	91	101	178	36	127	90
Tennessee.....	172	76	104	95	90	165	131	108	63	232	34	114	115
Texas.....	200	133	89	136	88	108	114	98	94	207	6	103	114
Utah.....	185	75	110	46	178	216	72	49	75	160	63	164	111
Virginia.....	116	88	73	107	126	113	124	156	88	114	80	71	108
Washington.....	23	164	77	54	57	44	97	80	78	98	116	98	87
West Virginia.....	136	103	64	100	94	131	116	106	88	106	95	117	105
Wisconsin.....	155	68	134	66	63	119	161	66	55	76	63	99	92
Wyoming.....	153	81	88	57	130	123	73	51	75	164	46	91	96

temperature records. Record maxima for November 2 were recorded at many stations in Washington and Oregon, and the 83° F. registered at Kosmos, Wash., on that date was the highest temperature ever recorded in the State during November. On November 11 maximum temperatures recorded at many stations in the Lake Region and Ohio Valley established new records for that date and for so late in the season.

The second week was abnormally warm throughout the country but principally in the northeastern quarter where weekly plus departures exceeded 15° at a number of stations. Chinook winds produced abnormally high temperatures in the northern portion of the western Great Plains during the last week of the month, with temperatures occasionally exceeding the normals by 20° to 35°. Weekly means exceeded the normal by as much as 19° and at some stations were the highest on record for that time of year.

Except for a few stations along the Atlantic coast and in the extreme Northwest, precipitation was generally much below normal, especially in the area between the Appalachian and Rocky Mountains where the percentage of normal for the month generally amounted to less than 25 percent. This was the driest November on record for Texas, Arkansas, Mississippi, and Louisiana. At many stations in these States and scattered stations throughout the Great Plains the month's precipitation amounted to only a trace or was entirely lacking.

During the third week snowfall was general over the northeastern quarter of the country with locally heavy

amounts along the shores of Lake Erie that measured 9 inches at Cleveland, Ohio, and 12 inches at Buffalo, N. Y. By the end of the month a snowcover ranging up to 10 inches in depth covered Michigan, northern Wisconsin, and Minnesota, and all of New England except coastal areas.

With warm, dry weather during most of the month, harvests were completed and other fall work made good progress. Fall grains were in good condition but needed rain at the end of the month. Crops were in poor condition only in Louisiana and Mississippi where deficient rainfall had persisted since the middle of October.

A destructive windstorm struck the Northwest on the 26th and 27th, causing damage estimated at \$300,000 in Washington, \$500,000 in Idaho, \$50,000 in Montana, and \$45,000 in Wyoming. Measured wind speeds at a number of stations indicated that speeds of 60 to 80 m. p. h. with gusts over 90 were general over most of the Northwest. At Cut Bank, Mont., 90 m.p.h. winds were measured and gusts were estimated at 105 m. p. h. Floods in the Skagit and other rivers of western Washington, resulting from heavy rains that accompanied this storm, caused damage estimated at \$500,000.

*December.*—The abnormally warm, dry weather of November continued through the first decade of December. Weekly means ranged from 9° to 15° above normal in the northern Great Plains and the only important precipitation fell in the coastal areas of Washington, Texas, and New England.

TABLE 3.—Monthly and annual precipitation amounts (inches), 1949

State	January	February	March	April	May	June	July	August	September	October	November	December	Annual
Alabama.....	6.58	6.20	6.16	5.79	4.07	5.76	6.71	4.61	3.31	3.37	0.80	4.01	57.87
Arizona.....	3.06	.76	.51	.38	.29	.84	1.97	1.25	1.63	1.15	.33	1.24	13.41
Arkansas.....	10.16	3.98	5.42	2.75	5.29	5.17	4.32	3.11	3.20	8.50	.37	4.77	57.04
California.....	2.30	2.68	4.30	.16	1.08	.06	.02	.10	.09	.27	1.68	1.94	17.68
Colorado.....	1.50	.67	1.52	1.13	2.50	3.26	2.18	1.30	.85	1.24	.24	.55	16.84
Florida.....	.88	2.69	2.19	5.16	2.34	7.55	7.86	11.05	7.60	3.72	1.86	2.39	55.29
Georgia.....	3.03	5.58	2.98	5.71	3.50	5.10	5.66	6.81	3.26	3.07	1.08	2.52	45.30
Idaho.....	1.00	2.91	1.03	.54	2.02	.65	.30	.35	.88	1.53	1.87	1.72	14.80
Illinois.....	6.09	2.63	3.21	1.77	2.77	4.19	4.40	2.90	2.76	5.17	.67	4.72	41.28
Indiana.....	7.74	2.89	3.81	2.01	3.36	5.36	3.50	3.66	2.64	4.89	1.12	4.21	45.19
Iowa.....	2.72	.87	2.44	1.33	2.68	5.51	3.47	2.34	3.21	1.93	.49	1.07	28.06
Kansas.....	3.09	1.14	1.06	2.18	5.34	5.93	3.83	2.72	2.22	2.42	.15	.87	31.85
Kentucky.....	6.86	5.35	5.17	3.52	2.78	5.52	4.09	4.54	1.84	4.53	1.82	5.70	51.72
Louisiana.....	6.11	4.82	8.25	6.53	2.35	5.20	8.03	4.04	3.94	7.30	.34	5.00	61.91
Maryland-Delaware	5.30	3.40	2.83	2.77	4.77	2.02	4.63	4.32	3.29	3.57	1.68	2.28	40.86
Michigan.....	2.70	2.10	2.05	1.62	2.75	4.17	4.21	2.45	2.78	2.49	2.25	2.80	32.37
Minnesota.....	1.55	.41	1.71	.74	3.24	4.08	6.20	2.01	1.74	3.24	.94	1.02	26.88
Mississippi.....	8.69	5.22	8.45	5.11	4.68	5.61	6.28	3.89	3.77	4.75	.39	4.21	60.95
Missouri.....	6.37	2.58	3.42	1.65	4.59	6.55	4.90	3.04	4.78	6.09	.45	3.67	48.09
Montana.....	.84	.95	.80	.67	1.94	1.71	1.26	.57	1.02	1.34	.48	.88	12.36
Nebraska.....	1.90	.29	2.46	1.52	4.84	4.92	2.36	2.74	2.19	1.70	.17	.29	25.38
Nevada.....	1.39	.94	.79	.24	1.77	.38	.26	.28	.27	.40	.52	.48	7.72
New England.....	4.08	2.85	2.23	3.47	3.75	1.70	2.74	2.86	4.28	2.29	3.13	2.51	35.89
New Jersey.....	5.99	3.68	2.61	3.73	4.77	.23	3.87	3.60	4.20	2.49	1.61	2.94	39.72
New Mexico.....	1.61	.63	.45	.92	1.23	2.11	3.01	1.62	2.44	.71	.07	.55	15.35
New York.....	3.49	2.41	1.98	3.33	3.15	1.47	3.28	4.28	3.64	1.79	2.69	2.74	34.23
North Carolina.....	2.83	3.75	2.94	4.46	4.68	6.26	6.65	9.31	4.02	4.10	2.87	2.30	54.17
North Dakota.....	1.14	.46	.60	.45	2.34	2.64	3.56	.99	.56	2.55	.30	.65	16.24
Ohio.....	5.58	2.70	2.91	2.67	3.05	4.25	4.22	3.31	2.71	1.68	1.47	2.96	37.51
Oklahoma.....	5.41	2.23	2.30	2.07	7.94	5.00	2.72	2.00	3.87	3.57	.13	1.64	38.88
Oregon.....	1.09	5.93	2.39	.83	2.37	.51	.22	.14	1.03	1.89	3.84	3.57	23.81
Pennsylvania.....	4.46	2.60	1.99	3.65	3.78	1.92	5.53	3.67	3.15	2.29	1.77	3.32	38.13
South Carolina.....	2.19	5.08	2.09	5.06	3.42	4.26	5.07	9.94	3.93	5.51	2.28	1.92	48.75
South Dakota.....	1.51	.14	1.22	1.18	2.58	2.00	2.02	1.93	1.57	2.15	.24	.65	17.19
Tennessee.....	8.43	3.42	5.56	4.15	3.68	7.01	5.90	4.28	2.00	6.61	1.25	5.18	57.47
Texas.....	3.62	2.37	1.78	3.96	3.25	3.23	2.94	2.32	2.80	5.56	.13	2.38	34.34
Utah.....	2.11	.90	1.46	.52	1.92	1.47	.70	.64	.77	1.69	.59	1.80	14.67
Virginia.....	3.78	2.69	2.66	3.50	4.75	4.72	5.84	7.01	2.83	3.40	2.02	2.17	45.37
Washington.....	4.99	6.25	2.51	1.80	1.14	.75	.66	.61	1.38	2.96	5.95	5.34	29.84
West Virginia.....	4.87	3.22	2.50	3.52	3.74	5.85	5.35	4.33	2.62	2.99	2.64	3.82	45.45
Wisconsin.....	1.92	.80	2.35	1.64	2.28	4.99	5.53	2.20	2.01	1.80	1.20	1.28	28.00
Wyoming.....	1.35	.69	.98	.94	2.57	2.14	.97	.68	.90	1.85	.36	.71	14.04

During the remainder of the month cold, rather dry weather prevailed in the West, while temperatures in the East were mild and rainfall was heavy in the Ohio and lower and central Mississippi Valleys.

This change in the weather pattern began with an intense storm which moved across the central portion of the country on the 11th and 12th. On these dates strong southerly winds preceding the storm brought unseasonably high temperatures to States east of the Mississippi River. Many stations in the Lake Region reported the highest temperatures on record for so late in the season. At the same time heavy rains fell in the lower and middle Mississippi Valley and local blizzards raged in the northern Great Plains and northern Rockies.

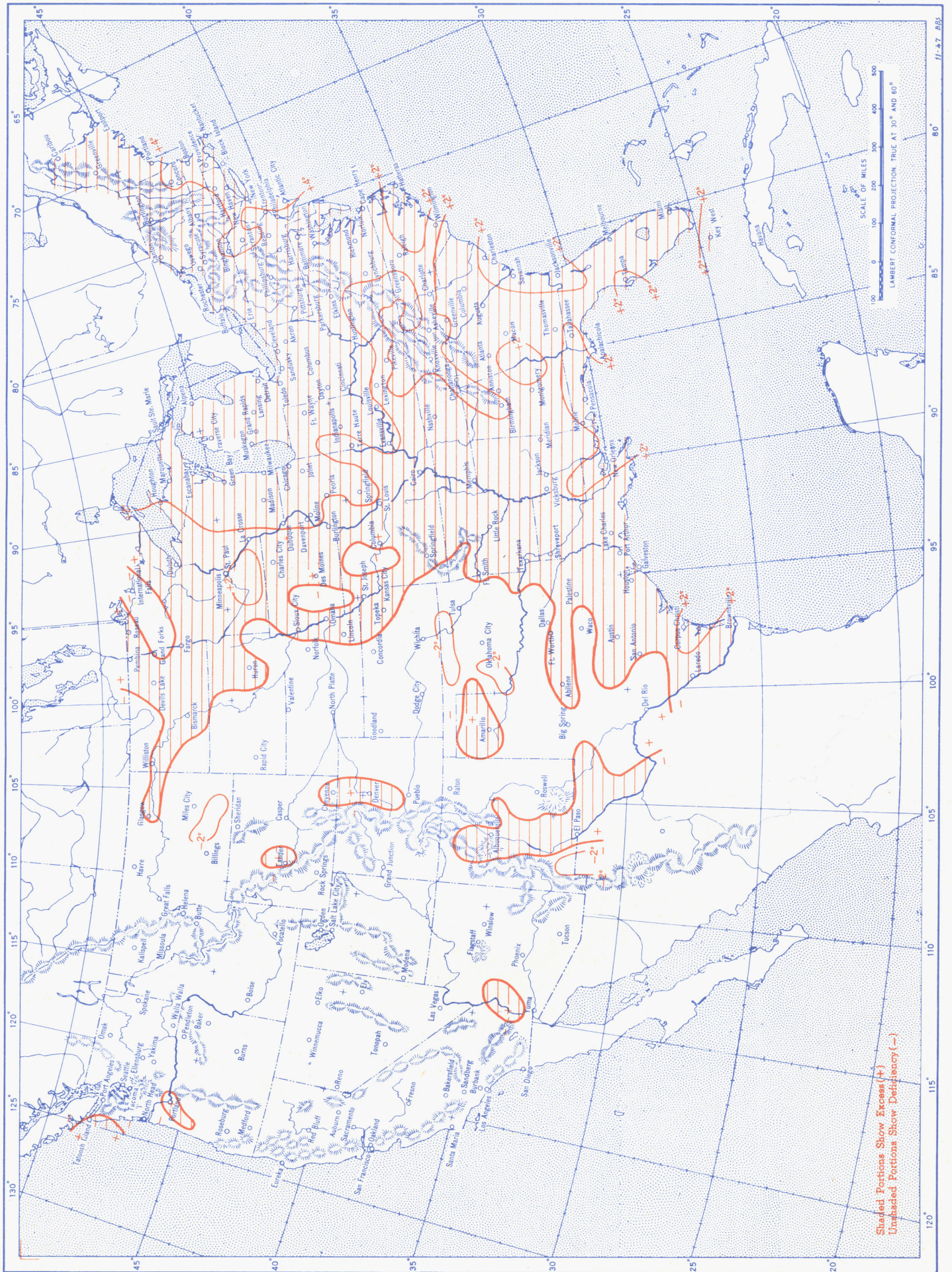
This storm was followed by a cold wave that brought subzero temperatures southward to northern Arizona,

New Mexico, and Kansas, and below-freezing minima to the extreme Southwest. By the 14th this cold air had overspread the Eastern States, and during the next day or two temperatures were normal or below with frost as far south as some Gulf stations and northern Florida.

From the 20th to 24th another cold air mass overspread the entire country. It brought damaging frosts to the coastal valleys of southern California and the Yuma and Salt River Valleys of Arizona on the 21st, to parts of the lower Rio Grande Valley of Texas on the 23d, and to northern Florida by the 24th. Heavy rains fell in the Midwest during this period, and a severe ice storm damaged communication lines and trees in northern Missouri and portions of western Illinois. Fair weather with rising temperatures generally prevailed over the entire country during the closing days of the month.



## Annual Temperature Departures (°F.) in the United States, 1949



## Percentage of Normal Annual Precipitation in the United States, 1949

